

## **Depleted Uranium Hexafluoride (DUF6) Conversion Facility Tour Talking Bullets January 14, 2009**

Van Transport Escort Narrator:

John Sheppard introduced himself as the DUF6 Conversion Project Manager for the Paducah, KY site.

North Access Gate:

- Entering Portsmouth Gaseous Diffusion Plant (GDP) Federal Reservation
- Encompasses Approximately 3,777 acres with 800 acre fenced core area
- Mission since 1950s to enrich uranium
- Approximately 250,000 metric tons of DUF6 stored in cylinders onsite

Right turn on Perimeter Road:

- On the right side is G yard, leased and shared cylinder yard (CY) with United States Enrichment Corporation (USEC). DOE cylinders primarily relocated from Oak Ridge Office on left side of yard.
- On left side (E yard: Uranium Disposition Services, LLC (UDS) signs on fence) is CY fence installed to separate DOE CYs from remainder of GDP.
- On left side is main access gate to DOE CYs E and C. Cylinders will be triaged in CY for conversion, and then relocated on a flatbed trailer in groups of 3 to the conversion facility full cylinder staging pad.
- On left side are 2 prototype gondola railcars, modified to carry up to 6 oxide-filled cylinders.

Left on Construction Access Road:

- On right is newly installed rail spur enabling rail access to the conversion facility.
- On right is USEC leased outfall, the DUF6 conversion facility and CY runoff/discharge path.

Right on B Street (UDS/DOE Conversion facility sign), Conversion Facility Access road:  
Stop at UDS gate #1:

- To the left is the Administration Building and warehouse. Warehouse is receiving and storage area, and staging area for CY and non-conversion operators.
- Note that the rail spur forks with the left fork proceeding to the area for receiving the conversion process oxide product and the right fork proceeding to the HF storage and load-out area.

Traveling east inside fence on left:

- Service water pump house.
- Potassium hydroxide (KOH) regeneration building: Houses KOH regeneration equipment, deionized water system, and effluent treatment system.
- Hydrogen fluoride storage (HFS) and load out facility: Storage area for aqueous hydrogen fluoride (HF) product, with installed capability to load out via tanker truck or railcar.
- Ahead is empty cylinder aging pad.

Traveling west along Conversion Building:

- On right is 64,000 sq ft pre-cast concrete conversion building (CB).
- Building nearest road on right is HF scrubber room. Contains skids of conversion process off gas scrubbing equipment, in addition to the process chilled water system chillers.
- On left is hydrogen (H<sub>2</sub>) generation modules. Leased system, methane/steam reformation process. **CORRECTION: H<sub>2</sub> generation modules are a PURCHASED (DOE owned) system.**
- On left is closed cooling water and process cooling water mechanical draft cooling unit.
- On left is nitrogen (N<sub>2</sub>) generation system, a leased system (Air Liquide).

After parking and off loading Van parallel to CB door S-5

- Ahead is full cylinder staging pad with X-Y crane, full cylinder transfer cart, and exterior airlock door.

DUF6 conversion building Tour Escort narrator:

Enter door S-5: Collect and don safety glasses and hard hats (24 sets will be staged)

John Shine introduced himself as the tour narrator and reminded attendees to be safe. He cautioned the tour attendees to be careful when walking around the rails, to notice that the floor had uneven surfaces with ramps in several places, to watch for patches of ice outside and to generally be aware of their surroundings within 360 degrees of where they stood at all times. John instructed that he would be reading the tour from a script and would not be answering questions; if attendees had questions, they should write them on 3x5 cards and give their cards to one of the tour escorts.

The tour inside the building began with:

- Entering the airlock where the tour proceeded through to oversized cylinder evacuation room door

- Ahead was the oversized cylinder evacuation room, with transfer cart/cradle. Cylinders not fitting into autoclaves can be emptied utilizing heating blanket staged on south wall.

The tour entered the autoclave/vaporization room.

- Ahead were 8 autoclaves (10 at Paducah facility) which constituted 3 processing lines and 1 cylinder transfer line.
- Ahead and above were the cylinder carts and Cylinder Handling System monorail crane. Cylinders are moved across the Conversion Building threshold with the monorail crane and placed into the autoclave cradle.
- Proceeding on left behind and straddling the autoclaves, were “hot boxes” containing valve manifolds and vacuum pumps.
- At the end of the row was a pad where the ninth and tenth autoclaves would be at the Paducah facility
- Ahead was Cylinder Stabilization System (CSS). After cool-down of the cylinder with heel, the cylinder will be placed on the CSS rotating table, the heel will be chemically stabilized, and then the cylinder relocated to the empty cylinder aging pad.

The tour entered the powder transfer room and then proceeded to west stairs:

- Upon entering the powder transfer room, ahead were the oxide drumming stations, vacuum transfer drums, and vacuum transfer piping to oxide hoppers on upper level.
- Above were the fluidizing gas heaters.
- To left were the fluidizing gas manifolds

Questions and answers:

Q1. Is the fluidizing gas just steam?

A1. The fluidizing gas is steam, hydrogen and nitrogen.

Q2. There are six conversion units. How do these align with the eight autoclaves?

A2. The autoclave room contains three processing lines, each with two autoclaves; the cylinder transfer line with its two autoclaves is not considered a processing line.

Q3. So, there are two conversion units for each processing line?

A3. Yes.

The tour ascended west stairs to lower conversion room and proceeded east:

- Ahead and to left were lower conversion units and heating jackets
- There will be 3 process lines at Portsmouth, 4 process lines at Paducah
- Above were steam super heaters; to the left and right, steam manifolds
- The room on left contained the roll compactors; they will compress oxide powder for metered gravity feed to an upended cylinder below

Q4. Steam lines aren't insulated. Is that by design?

A4. (Question referred to specific observed section of steam line piping) I can't tell you; I would have to look at the section in question. **Follow-on explanation: Currently, the steam supply system is undergoing system testing, and portions of insulation have been removed to support testing or repairs.**

Control Room window on the right, the tour ascended the east stairs and looked into control room:

- Control room is the monitoring point for plant
- Most operations are controlled and monitored by an integrated control system
- Cylinder evacuation process will be controlled from there: there are operator work stations throughout plant.

Q5. Is this all DOE software?

A5. It will be at the time of contract award.

Q6. What is that room behind the control room?

A6. It's an administration area.

The tour ascended to the upper conversion room and proceeded west where John:

- Cautioned about the low overhead in areas and noted that this area was not normally occupied
- Pointed out the conversion units and instrument racks
- Noted that the fourth line at Paducah would be at the end of the room

The tour proceeded east after ascending west stairs to conversion room mezzanine:

- Upper conversion units in their heat jackets
- Noted backup filter housing and off-gas (HF) piping; reviewed that HF is offgas, and it would flow to condensers: Liquid HF would then drain to receiver tanks, while non-condensed offgas would continue to scrubbers prior to exit up vent stack on electrical room roof
- Pointed out heating jacket ventilation tie-in and noted the upper region requires cooling
- Identified heating, ventilation and cooling (HVAC) dampers/roughing filters
- Indicated oxide hoppers and explained that vacuum transfer empties into hoppers, that a gravity metered feed goes to the compactors and then to an upended cylinder below
- Pointed out vacuum transfer system blowers that provide the suction to pull the oxide up from the drumming station into the hoppers.

Tour attendees then proceeded to the main level and north and west through the cylinder modification/hot shop area. John identified:

- Airlock for aged cylinder return to hot shop
- Sintered metal filter cleaning tank
- Evaporator
- Cylinder modification system; pointed out that the flange is mounted and hole is cut in top of cylinder
- Cylinder Upenders and filling station
- 20 Ton crane and airlock

Q7. Of the thirty-five systems, how many have been accepted?

A7. All have been accepted for system testing at Portsmouth.

Q8. Are they ready to be tested?

A8. Yes.

Q9. What is the milestone?

A9. Completion of system testing and turnover to operations is a condition for the ORR, which will occur prior to contract transition.

Proceeded out the north personnel access door (N-9) to observe the other end of the 20 Ton crane and the:

- Full oxide cylinder staging area
- Rail spur
- Rail car loading crane (Prototype car will hold up to six cylinders)
- Cylinder transfer cart

Q10. Do you anticipate loading trucks out here, too?

A10. That option is available.

Walked toward mechanical room; allowed tour attendees to view into room through Door N-4 and observe:

- Instrument air compressors and dryers
- HVAC chillers
- HVAC Chilled water pumps

Q11. What is the jib crane on the roof for?

A11. The crane handles material and supports maintenance in that area; primarily two main fans.

Walked toward electrical room to observe:

- Two redundant 13.8 kV electrical feeds that come into the plant underground from the USEC-controlled switchyard
- 13.8 kV switchgear

- Four 480V transformers
- Behind the transformers is a standby diesel generator that is not safety significant
- Above electrical room is main ventilation discharge stack-Building is maintained at slight negative pressure, all air/scrubbed off-gas exhausts through stack

Enter electrical room Door N-1:

- Uninterruptible Power Supply
- Automatic bus transfer switch tied to Stand-by Diesel Generator, which is not safety significant
- Four substations
- Various motor control stations, 480V switchgear

Proceed out of electrical room door W-5:

- Standby diesel generator
- HVAC chiller cooling water mechanical draft cooling tower

Q12. Will there be a Process Flow Diagram?

A12. Yes. Facility design documents and Process Flow Diagrams will be posted on the FedBizOps web site; access will be limited and require offeror registration to view.

Comments: Cylinders will come in on flatbed trucks by threes and will be staged on full cylinder staging pad.

This plant is based upon a currently operating facility.

This (conversion of DUF6 to U3O8 suitable for disposal) completes the fuel cycle womb-to-tomb..

End of tour: Crossed the full cylinder pad to door S5 and proceeded into DUF6 cylinder airlock where attendees returned their safety glasses and hard hats. They then returned to the passenger van parallel to door S-5 and exited DUF6 facility through slide gate #1.